National Institute of Environmental Health Sciences

Summer temperature variability and long-term survival among elderly people with chronic disease

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Abstract:

Time series studies show that hot temperatures are associated with increased death rates in the short term. In light of evidence of adaptation to usual temperature but higher deaths at unusual temperatures, a long-term exposure relevant to mortality might be summertime temperature variability, which is expected to increase with climate change. We investigated whether the standard deviation (SD) of summer (June-August) temperatures was associated with survival in four cohorts of persons over age 65 y with predisposing diseases in 135 US cities. Using Medicare data (1985-2006), we constructed cohorts of persons hospitalized with chronic obstructive pulmonary disease, diabetes, congestive heart failure, and myocardial infarction. City-specific yearly summer temperature variance was linked to the individuals during follow-up in each city and was treated as a time-varying exposure. We applied a Cox proportional hazard model for each cohort within each city, adjusting for individual risk factors, wintertime temperature variance, yearly ozone levels, and long-term trends, to estimate the chronic effects on mortality of long-term exposure to summer temperature SD, and then pooled results across cities. Mortality hazard ratios ranged from 1.028 (95% confidence interval, 1.013- 1.042) per 1 degrees C increase in summer temperature SD for persons with congestive heart failure to 1.040 (95% confidence interval, 1.022-1.059) per 1 degrees C increase for those with diabetes. Associations were higher in elderly persons and lower in cities with a higher percentage of land with green surface. Our data suggest that long-term increases in temperature variability may increase the risk of mortality in different subgroups of susceptible older populations.

Source: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3340087

Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Air Pollution, Temperature

Air Pollution: Ozone

Temperature: Fluctuations

Geographic Feature:

resource focuses on specific type of geography

Urban

Geographic Location: ☑

resource focuses on specific location

United States

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Cardiovascular Effect, Diabetes/Obesity, Respiratory Effect

Cardiovascular Effect: Heart Attack, Other Cardiovascular Effect

Cardiovascular Disease (other): heart failure

Respiratory Effect: Chronic Obstructive Pulmonary Disease

Mitigation/Adaptation: ☑

mitigation or adaptation strategy is a focus of resource

Adaptation

Population of Concern: A focus of content

Population of Concern: ☑

populations at particular risk or vulnerability to climate change impacts

Elderly, Racial/Ethnic Subgroup

Other Racial/Ethnic Subgroup: African-American

Resource Type: ☑

format or standard characteristic of resource

Research Article

Timescale: ☑

time period studied

Time Scale Unspecified

Vulnerability/Impact Assessment: ☑

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content